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CORPORATE
INFORMATION MANAGEMENT
AND HQDA

BY

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CORPORATE INFORMATION MANAGEMENT AND HQDA

AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

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Headquarters Department of Army (HQDA) must reengineer its business processes and then apply information engineering techniques and methodologies to develop an efficient and effective information resource management (IRM) structure. The current DOD Corporate Information Management (CIM) initiative provides an excellent blueprint for accomplishing this. CIM is an excellent "total management" approach to IRM and business process improvement. It recognizes that information and information systems (IS) are assets and provides a set of tools to integrate IS into the total business environment. This will help achieve the best return on the Army's IS investment in terms of productivity and customer satisfaction. There are 4 CIM management tools (enablers) that should be used: Reengineering (the business process and IS), Information Engineering (IE), Functional Economic Analysis (FEA), and Total Quality Management (TQM). This study examines the current HQDA business environment; an environment characterized by IS Stovepipes and industrial era organizational and business concepts. It attempts to identify the problems caused by the current environment and clarify how CIM can help to eliminate them.

INTRODUCTION

The Headquarters Department of Army (HQDA) should reengineer its business model and information systems (IS). There are 4 management tools (enablers) HQDA should use for this purpose: reengineering, information engineering (IE), economic analysis, and Total Quality Management (TQM). The current DOD Corporate Information Management (CIM) initiative provides an excellent blueprint for accomplishing this. I reached this conclusion after studying literature on management and information systems (IS), conducting personal interviews with IS professionals, and considering my personal experiences.

The personal interviews included discussions with IS executives from five major corporations: Mr. John Raitz, Vice President for Information Processing for a large hospitality and service corporation; Dr. Douglas Locke, Sr. Technical Advisor for Software Development for a major information technology (IT) corporation; Mr. Steve Peterson, Information Technology Manager for a major IT corporation; Mr. T.B. Hudson, Applications Manager for a major petroleum manufacturing corporation; and Mr. Timothy J. Slusser, Director, Information Resource Management for a major defense contractor. The interview results, definitions of key terms, and problems caused by ADP stovepipes and managing without CIM are addressed in the discussion section (a case study is used to highlight the problems). In the conclusion the benefits of an effective corporate information strategy, alternative courses of action, and a recommendation are addressed.

A brief note about the interviews with the five IS executives follows. They graciously made time for the interviews and were very candid and forthcoming. However, some of this information is sensitive and proprietary. I agreed with each, at the outset, to include only general information in my paper and not to refer specifically to individual corporate strategies. These firms take pride in their IS strategies and structures. They spent many years and a great deal of money on their development. Quite naturally they consider much of what they did and plan to do proprietary. If the details were divulged they might suffer, competitively, in their respective markets. Therefore, my comments about the private sector do not refer to a particular company.

BACKGROUND

Headquarters, Department of Army (HQDA) business activities take place within an industrial era organizational model.[1] This model is supported by a broad range of Automated Data Processing (ADP) systems called stovepipes or silo management information systems (MIS). Stovepipe or silo systems are narrowly focused; they usually support a single functional activity or process; and they have limited, if any, external electronic links to other systems. The Planning, Programming, Budgeting and Execution System (PPBES) is the framework for HQDA business activities. To be effective the individual phases must be integrated so that a high degree of process interaction, information sharing, and knowledge building can take place[2]. The ADP stovepipes and the

current HQDA business model make this difficult, time consuming, and costly. People often substitute the narrow goals of their department for the larger goals of the organization. When work moves from one worker to another delays and errors are inevitable and accountability becomes blurred. Since no one sees the whole picture it is not possible to respond to new situations quickly.[3] Decision makers must wait while information is slowly passed from one person to another through the organization for analysis, coordination, and reconciliation. Management is defined as the process (or art) of achieving objectives through the actions of other people. The manager classically plans, directs, staffs, organizes, and controls. In short, management is decision making, and it is difficult in the current HQDA environment.[4]

To integrate PPBES and create an effective management environment HQDA should use CIM to "reengineer" its business model[5]: Reengineering the business model would take 4 steps. First, the functional community must build a business process model based on business practices that improve overall performance. This model should reflect the constraints of economics and risk.[6] Second, the IS community must build a data model that describes the flow of data through the organization. Third, the IS community and the functional community must use IE to create an enterprise model by integrating the business model and the data model.[7] The enterprise model should be developed, maintained, and stored using Computer Aided Systems Engineering (CASE) tools.[8] Fourth, senior management should use the information these three steps provide to guide their organizations

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through the changes needed to implement the new model. In today's world change occurs more often than in the past and business requires a management framework that moves an organization from the static stage through the fluid stage and into the dynamic stage. In the dynamic stage people work with new machines or processes and anticipate the next changes.[9]

These four steps are key to creating a business model (environment and IS infrastructure) that can accomplish corporate goals and objectives. In DOD this approach to business improvement is called CIM. In DOD an extensive CIM program is already underway. HQDA should implement it as soon as possible. The current HQDA IS infrastructure and business model impedes the headquarter's ability to respond effectively to management challenges such as downsizing and shrinking budgets. In the past, when the business environment was relatively static it was possible to "get by" using the stovepipes and outmoded business practices. However, today's environment is fluid and the Army's business model needs to change.

During this century the Army has done an exceptional job of adjusting itself to meet any military threat and remain an effective fighting force. It accomplished this by changing its military doctrine, structures, and processes to accomodate new technology, resource limits, and changing war fighting roles and responsibilities (increased role of the CINCS and the Joint Staff). Now, the Army must show the same resolve to improve its business model and IS so it can remain effective into the twenty first century.

CIM can help the Army to manage better, now and in the future, by increasing information sharing, integration, information availability, and flexibility. CIM can help ensure management has timely, accurate, and consistent information for decision making; it can help to achieve this within the constraints of risk and cost.

DISCUSSION

Definition Of Key Terms. It is important to define several terms used in this paper: corporate information, data standardization, data synchronization, data management and corporate information management. For purposes of this paper the following definitions apply. Corporate information is shared information that moves vertically and horizontally across functional areas within a business activity. Data standardization is the process of making data uniform so that a data element has the same attributes and definition regardless of the system or application using it. Data synchronization is the organization of data according to events within a sequence or date and time of production. Data management refers to planning for the use, allocation and conservation of data and specifies the rules for processing, storing, and disseminating it.

CIM is the economic and efficient administration and control of shared information resources. Its purpose is to achieve and .intain an integrated, consistent, and effective IS support structure for business activity. Data management is a key facet of corporate information management. CIM recognizes that

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information is a valuable corporate resource and must be managed like other corporate resources: people, material, money, plant, and equipment. A comprehensive corporate information management strategy will assist with creating a single approach for dealing with the acquisition, standardization, classification, inventory, dissemination and use of every kind of information. It is intended to encourage the flow and sharing of information throughout an organization. CIM focuses on obtaining the best possible return on investment in information resources. When successfully applied it can help management target and achieve corporate goals.[10] As part of DOD's Defense Information Management Program (see DOD directive 8000.1) former Deputy Defense Secretary Donald Atwood made the following statement when he announced a DOD CIM program in October 1989.

> "CIM establishes procedures that make information technology
> a tool to enable the development of creative solutions."

The DOD CIM program is one of nine programs included by the Office of Management and Budget on the Presidential Priority List. Congress is allocating about $1 billion a year to it so that DOD can change its business processes to handle information better.[11]

Corporate Information Management and stovepipe management are very different. ADP stovepipes are usually designed to support a single functional area or process and operate using their own data source(s). Stovepipes can exchange information with other systems but the data is usually not synchronized or standardized across the systems and so communication can be difficult and unreliable.

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Tracking changes from one stovepipe to another is often difficult and futile; and, maintenance of interfaces among them is usually very costly. stovepipe management focuses on supporting a single functional area; and, information generally moves vertically from the bottom to the top--one person at a time.

Difficulties Caused By The Lack Of A HQDA CIM Strategy. There were three major studies done between 1979 and 1988. They identify and describe the difficulties resulting from the lack a HQDA CIM strategy. A summary of each study and a case study that highlights the difficulties follows.

<u>An Information Management Study for HQDA</u>. In 1979 Arthur Young and Company studied information resource management at HQDA and summarized the problems then and now. There were five major findings.

1). There is insufficient knowledge of information availability. Personnel often do not know what information is available, where it is, how to get it, and what it means.

2). There is limited information sharing among agencies due in large part to their vertical stovepipe orientation. There is limited use of data processed by other organizations. Coordination of the definition, representation, processing or storage of data is also limited.

3). Excess costs are incurred due to redundancies in information collection, processing, reporting, and retention. These factors lead to inconsistencies among

databases, high operating costs, and excessive man-hours expended sorting the information needed from all the data collected.

4). HQDA information systems lack sufficient flexibility to accommodate change. At HQDA events move rapidly and change is inevitable. When the ADP systems were unable to accommodate change the tendency was to build a new system. However, the environment is such that questions in the future are not quite the same and so the new systems are not sufficient.

5). The information decision makers receive may be inaccurate, inconsistent and untimely. This may lead to a great deal of stubby pencil work getting the right information. Inconsistent and untimely answers can also lead to DOD or Congressional cuts in budgets and appropriations.[12]

Department of Army Corporate Data Base Concept and Strategy. In August 1983 the Vice Chief of Staff of the Army (VCSA) convened a study group to address the force modernization and documentation problem in the Army. This effort produced a paper titled, "Department of Army Corporate Data Base Concept and Strategy," published on 5 March 1984. The paper's purpose was to provide a concept for supporting Department of Army information requirements in the eighties and beyond. The study pointed out that data processing support to users was technology driven and evolved in a decentralized manner. ADP systems were developed to satisfy the specific needs of individual commands or a given functional area.

In the aggregate the stovepipes contained large amounts of information but the data was not integrated. The study went on to say that Army decision-makers need organization-wide information to manage. This information must not be affected by organizational bounds; and, it must flow at all levels within the organization. It points out that, to meet Army goals, staff elements must share information and integrate this information for decision makers. In the study the following statement is made.

> "the Army is in the midst of the most massive and turbulent period of modernization and reorganization since mobilization for W.W.II....Changes in the operating environment of the Army and other factors have caused a loss of control of in-place systems....which are now perceived more as obstacles than management systems."

The study stressed that there was no DA staff organization primarily responsible for the headquarters' information needs and overall IS performance. A principal finding was that because stovepipe systems lacked integration Army units were not receiving the right equipment and personnel--asynchronous operational Army systems.

The study recommended the development of a corporate data base (CDB) to help manage diversity. The CDB would provide an environment for centrally managing and sharing data while decentralizing application development. The CDB would have several primary effects: allowing the development of data, process, and domain synchronization; institutionalizing the basis for good staffing procedures; integrating IS; and fixing responsibility for data ownership and proponency. The CDB would

have second order effects: providing for future IS development from a common set of data; providing for a wide range of management models.[13]

Organizational Analysis And Resource Management Planning: A Final Report. In December, 1989 the Rand Corporation published their final report resulting from the "Organizational Analysis And Resource Management Planning Project." This project's purpose was to analyze Army organizational structures and information flows; make recommendations for improving Army resource allocation procedures and results; provide methods for analyzing organization and management information system issues. The project's initial focus was on manpower and personnel planning systems. However, the Rand study group realized that the entire Army planning system needed to be more responsive to OSD's Planning, Programming and Budget System (PPBS).

Their final report noted that due to its planning environment the Army had difficulty responding to OSD guidelines and picking its best option. The environment led to inconsistent plans, programs, and execution. Rand said the Army system was highly reactive and not proactive; managers frequently had no insight into the impact of their decisions.

The Rand study recommended that the Army reorganize around what they called a "structured response concept of operations." They recommended a "Neutral Integrator" (NI) be established on the HQDA staff with responsibility for all relevant data and models. However, the staff components would often function as intermediaries between the NI and the Major Army Commands. They

also recommended the creation of a "logical" data base at HQDA to integrate the key management data stored in the ADP stovepipes. The data base would provide for varying levels of data aggregation and provide the capability to relate execution data to implementation plans.[14]

The three studies have four principal findings and recommendations in common.

1). Army organizations and business processes do not adequately support management and need to be redesigned.

2). Army IS operations are asynchronous and dysfunctional. They need to be modernized or replaced with a system(s) that provides decision makers with a holistic view of the Army. Decision makers need to know the full impact of implementing policies and strategies.

3). Army IS needs to be centrally managed to ensure that it is driven by business needs and reflects senior management's goals and strategy. Simultaneously, the responsibility for applications development and execution should be left with the operators (both line and staff) who are responsible for executing programs.

4). Army IS must be integrated because organizations are not independent of each other; and, they are all affected by their environment. Information constantly flows in and out of organizations affecting each part of the management process: planning, coordinating, controlling, and directing. Therefore,

management cannot afford to work in a vacuum and must
have timely, accurate, and complete information to make
the right decisions.

Most of the workers at the headquarters are "information
workers."[15] It is very difficult and time consuming for them to
work PPBES issues when each functional proponent uses a different
ADP system(s). They have nonstandard, unsynchronized, and
redundant data. They also operate on different processing cycles.
Thus a planning, programming, budgeting or execution action may be
taken based on erroneous, inconsistent, irrelevant or old data or
information. CIM can help eliminate these difficulties. An
example of leadership difficulties due to the absence of a CIM
strategy occurred in 1986 when DOD required the Army to
demonstrate its ability to track programs and changes from
planning through execution in PPBES.

Case Study. DOD asked the Army to explain its growth in
officer requirements by approximately 10,000 from 1976-1986. Army
personnel examined force structure changes for the period
discovering there was no audit trail crossing the major PPBES ADP
systems; the data was not consistent; and the level of detail
varied from one system to another. Therefore, it was not possible
to answer DOD's question at the desired level of detail. Some of
the officer growth was due to changing doctrine and force
structure designs or special interest programs. Examples included
Army restructuring actions like "Army of Excellence" that
downsized the heavy divisions and created the Light Infantry
Divisior (LID). However, DOD wanted the Army to provide an audit

trail detailing the changes through each PPBES phase and down to major unit (division) and subordinate unit (battalion) level of detail.

Many hours and dollars were spent reviewing the information contained in at least six major Army systems: the Force Accounting System (FAS), the Structure and Composition System (SACS), The Army Authorization Documentation System (TAADS), the Program Optimization and Budget Evaluation (PROBE) system and the Personnel Management Authorization Document (PMAD) system. These systems contained considerable information about the Army's force structure but in system unique languages and for discrete purposes. There was no common thread linking them and some had no audit trail. Finally, the data these systems contained was not standardized or synchronized. DOD's question could not be answered because each major HQDA department was functionally specialized and could discuss the data only from its unique perspective. In short, no department or agency had the whole picture so information answering the question was not available. Whether or not failure to provide the requested information was the sole reason the Army lost the 3,500 officer spaces is debatable but it was a significant factor. A significant point is that from 1979 to 1988 the Army made limited progress addressing the problems identified by the 1979 Arthur Young study, the 1984 Army Corporate Data Base study, and the 1988 Rand Study.

The Evolution Of IS And IS Management In The Private Sector. Although computers were already being used by big business during the sixties their use was usually restricted to research and

development and some accounting functions. Punch cards were still quite common. In the seventies and early eighties mainframe computers began to proliferate. However, they were usually under local site control, not electronically linked, and business applications were not integrated. Corporate America calls them stovepipe or silo systems. Most major divisions or other large organizational elements developed their own independent data centers. These usually had unique operating systems and supporting infrastructures: personnel, hardware, software, facilities, and operating regimes. They were primarily focused on a particular functional area or command.

Generally, in the mid-eighties pressure built to expand computing to the desktop. The pressure was caused by the increasing availability of inexpensive personal computers, word processing software and office communication systems like electronic mail (Email). At the same time the push to mid-range computing began. Mid-range computing involved the use of powerful computers that were smaller and cheaper than mainframes. This area was opened up by advances in communications and protocols that made data transmission practical and cost effective.

All the companies studied acquired or began acquiring (purchased or leased) their own telecommunications system. They implemented systems that linked their business activities and employees together. By using established protocols information and data could be shared at anytime, internally and externally. The companies examined use their telecommunication system to link their IS and personnel globally. These systems are usually menu

driven and require only a personal user identification (USERID) code, a password, and the USERID of another individual to electronically link people and computers. Each IS system can be accessed from the employee's desktop computer.

As IT and IS expanded during the eighties corporate expenses grew and companies took steps to control costs. Between 1980 and 1991 U.S. corporate IS budgets grew from 27.2 percent of corporate capital spending to 35.2 percent. These estimates are from Morgan Stanley and Company economist Stephen S. Roach. In the service sector of the U.S. economy--banks, insurers, and hotels--he estimates $862 billion dollars were spent on IT during the 10 year period ending in 1991.[16] During most of the eighties although managers expected to achieve productivity gains from IT expenditures most viewed IT as an expense not an asset. In general, upper level management left the management of IT to the IS organization. However, to control costs senior management took steps to centralize IS control, reduce the number of data centers, and the IS staff size. Centralization and consolidation were made possible and practical by IT advances that improved communications and computers and reduced costs.

As business took steps to contain and reduce costs there were problems. Many of the stovepipe or silo systems had unique operating regimes, nonstandard hardware and software (requiring conversion or integration), old and new equipment mixed, commercial off the shelf software, and nonstandard and redundant data. There were also organizational problems related to IS control: customer support, training and retaining IS

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professionals, and paying IS operational costs. In short, the companies studied had already invested a great deal in IS but would have to invest a great deal more to leverage it for their competitive advantage.

Often during the seventies and eighties IT investments were made based on vague ideas and promises. However, there were some notable successes: Federal Express's package tracking system, Merrill Lynch's Cash Management Account, Citibank's automated teller machine network and American Airline's Sabre reservation system (by the late eighties it was generating nearly $500 million dollars annually for its parent AMR). None the less, during the eighties, white collar productivity declined overall and there were more IT failures than successes.[17]

Business began realizing that computers were a mixed blessing and that acquisition, maintenance, and training costs were high. It also required a lot of time and effort to get people to accept them. It is estimated that technology diffusion in a company takes about 5 years.[18] The companies studied recognized that computers could not improve business by themselves. Successful software development, hardware acquisition and installation required not only a large dollar investment but an equally large human resource investment at all levels of the organization. The companies studied identified 10 critical components of an effective corporate information management program.

> 1). IS must be fully integrated: hardware,
> software, and telecommunications.

2). IS should be centrally managed as part of a total corporate information resources management program. It is critical that IS direction come from top management to ensure it focuses on achieving corporate goals and objectives. IS Centralization does not mean taking the end user (customer) out of the loop. It means that IS rules (principles) should be established and implemented by top management. The central IS organization must help ensure compliance. Today's technology makes centralization feasible and practical as well as possible to avoid the organizational tension typically associated with IS centralization.

3). To fully leverage information resources you must understand the supported business and its customers. Top management must clearly articulate the company's goals and objectives. Prior to expending resources, on IS, examine business processes and reengineer where necessary; carefully define IS requirements. Each IS organization studied is an important player in their company's reengineering effort.[19]

4). Today, it is more appropriate to think in terms of "levels" of computing than tiers of computing since the typical IS architecture is seamless.[20] Advances in IT enable people to easily move back and forth from the desktop to the midrange or the mainframe

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computer. The movement is almost transparent to the user.

5). Systems data must be managed to protect the integrity of the corporate IS. All of the IS managers interviewed recognized how important this is. However, data management is costly and time consuming and most companies studied have only begun this task.

6). Management Information Systems must continue evolving. They must become more robust and flexible. Decision Support Systems and Executive Information Systems that take full advantage of artificial intelligence, word processing, and graphics capabilities must be implemented to serve decision makers.

7). The human-computer interface must be carefully managed. This is difficult because people are initially reluctant to accept computers. People also tend to become proprietary once they start using them and are reluctant to share and change. The different business groups in companies tend to operate autonomously and develop their own nonstandard systems. Top management and the central IS organization must manage the human-computer interface carefully.

8). IS architecture's should use mainframes for data repositories and move all processing to the client-server at the operating level. The IS infrastructure must support moving data and information vertically and horizontally in the organization.

9). IS must reengineer itself to ensure it is providing maximum support and return on investment (ROI). IS personnel must be retrained to think in the new client-server paradigm. They must move from the old COBOL environment to the new, open systems, UNIX environment. They must develop a strong partnership with all corporate business units.

10). The IS function must pay for itself by charging the customers for all services. In each company studied it is operated as either a cost center or a profit center.[21] In each company IS is outsourced completely or in part or the company maintains an internal capability. In either case, all IS costs are paid by the customer. Elaborate costing mechanisms are used to itemize costs and provide a complete accounting to the customers. Since the customer pays for all goods and services the success or failure of IS is dependent upon giving good service and maintaining good customer relationships.

Parallels Between The Evolution Of IS In The Private Sector And The Army. IS in the Army and the private sector have evolved similarly. Initially, computers were used in areas such as research and development, finance and accounting, personnel, and logistics. As computing "skyrocketed" in the eighties most major activities bought their own IS capability. These IS organizations supported functionally specific areas and were stovepipes. They were not integrated or under central IS control within the Army.

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By the mid-eighties personal computers (PC) and communications technology made it possible to put a PC on everyone's desktop and to begin linking them together within offices.

Also during the mid-eighties initial steps were taken to control growing IS costs by creating a central Army IS management organization; there was much resistance and many difficulties. Organizations that used IS technology did things their own way and resisted efforts to reduce their prerogatives. Since there was no central management of Army IS prior to 1984 there were many different types of hardware and software in use. It was not uncommon to find Apple, IBM, Lanier, Wang, and other brands of PCs, associated software, and peripheral devices in the same office. At the mainframe computing level conditions were similar in terms of hardware, software applications, and operating systems and regimes. These factors made Army IS, as in the private sector, a veritable "Tower of Babel." These factors and others combined with Army management's limited understanding of IS caused early attempts to centrally control IS to fail.

From 1984-1986 the Army leadership took several steps to organize and control IS. Existing regulations were revised or replaced by a new AR 25 series; U.S.A. Information Systems Command (USAISC) was formed at Ft. Huachuca, Az.; and at HQDA the Director of Information Systems for Command, Control, Communications, and Computers was established. However, the problems were of such magnitude (management, understanding, and size) that little progress was made in areas such as standardization, data management, configuration management, and integration. Army IS

budgets in the nineties are being drastically reduced so changes must be made. The budget reductions are occurring when productivity improvements and the better decision making tools, expected from IT, are needed most. Like the private sector the Army must find ways to downsize and manage change (not just the "chaos of change"[22]) while improving its productivity and management.

CONCLUSION

Many people believe that IS can improve productivity and provide competitive advantages. Information management is considered an integral part of business management. Still, people are frustrated by IS due to: escalating costs, failed projects, costs overruns, development delays, and backlogs. This situation, generally, was not due to limited IS funding but failure to understand IS capabilities, technology fostered language barriers, and the disjointedness of IS within organizations. These conditions have prevented the integration of IS within the Army's mainstream business activities. Consequently, large portions of IS resources may be supporting activities of limited value to the Army.[23]

Another important reason that heavy investments in IT have delivered disappointing results; is that organizations tend to automate the old ways of doing business and leave the existing processes intact. Henry Philcox, Chief Information Officer (CIO), at the IRS says, "If you start with a mess and simply add technology, you end up with an automated mess."[24] During the last

14 years the Army made organizational changes and spent millions
on IS but the evidence indicates that management effectiveness has
improved only marginally. The latest study confirming this
conclusion was the 1988 Rand report. One important reason for
this may be the Army's reluctance to radically change how it does
business. This is very disturbing since the DOD and Joint Staff
have changed how they do business.

Many of the Army's current job designs, work flows, control
mechanisms, and organizational structures came of age in an
environment that preceded the advent of computers and the IT
explosion. At the heart of reengineering is the notion called,
"discontinuous thinking"; recognizing and breaking away from the
outdated rules and fundamental assumptions that underlie
operations. Cutting fat and automating existing processes is
insufficient. The old assumptions and rules that made a business
initially underachieve must be challenged.[25]

The Army can overcome these problems by adopting a total
management approach that assimilates and integrates all
information functions and technologies into the total
organization. This is the approach adopted by the companies
studied and it incorporates the ten aforementioned components. It
will cause all organizational levels to work together setting
goals and priorities, determining the organization's information
needs, and matching them with the technology and other resources
necessary to achieve the goals. IS must be recognized as an asset
not just an expense. The basic driving force behind managing
information as an asset (Information Asset Management) must be

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management's goals. Management's goals will drive the user's requirements and, in turn, IS capabilities.[26] Because so many new technologies "exploded" onto the scene during the eighties it was to easy to become dominated by technology driven visions instead of business driven visions.[27] CIM is a total management approach that can turn this situation around and replace technology driven visions with business driven visions.

What Can Be Done? Corporate Information Management (CIM) provides an excellent "total management" approach to IS. It recognizes that information and IS are assets. CIM provides a set of tools that can integrate IS into the business and help achieve the best return on the Army's IS investment. There are 4 management tools (enablers) that should be used to achieve this: reengineering (the business process and IS), information engineering (IE), Functional Economic Analysis (FEA), and Total Quality Management (TQM).

Reengineering will be discussed first. There are seven principles of reengineering that should be applied as part of CIM:

1). Organize around outcomes not tasks.

2). Have those who use the output of the process perform the process.

3). Subsume information processing work into the real work that produces information.

4). Treat geographically dispersed resources as though they were centralized. The conflict between centralization and decentralization is a classic one but no longer necessary. You can use databases,

communications, and standard processing systems to derive benefits of scale and coordination while maintaining flexibility and customer service.

5). Link parallel activities instead of integrating their results.

6). Put the decision point where the work is performed and build control into the process.

7). Capture information once and at the source. Stovepipe computer systems are undesirable because they foster data redundancy and undermine data integrity. Integrate and connect the systems thereby eliminating redundant data entry, the attendant checking functions, and inevitable errors.

Executive leadership with vision is a must for reengineering to succeed. Few people in an organization want reengineering. It is confusing and disruptive. It affects everything people are accustomed to.[28] Machiavelli described the problem faced by those who must bring about change:

> "It must be remembered that there is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage, than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the institutions and merely lukewarm defenders in those who would gain by the new one."[29]

Information Engineering (IE) is the second CIM management tool discussed. James Kerr in the Journal of System Management made the following statement.

"IE is an integrated set of formal techniques for planning, analysis, design, and construction of information systems from an enterprise-wide business perspective."

IE is comprised of business, data, process, and enterprise modeling. Business modeling defines the information generated and how it flows within an organization. Data modeling is a systematic way of identifying the data items contained in the information flows defined by the business model. Process modeling defines how data is manipulated by an organization. The Enterprise model integrates the defined data and processes into a complete picture.[30] When using IE the system's data requirements are defined before designing the application used to manipulate them. This effectively separates the data from the applications. This approach results in flexible systems, integrated applications, interruption-free development, rapid design, lower IS expense, and improved IS staff retention.[31] IE provides good definition at the data and process level but only reflects what is and not what should be concerning the business itself. Therefore, it is essential to apply reengineering to the business process and organization prior to applying IE. That is why senior management must lead and ensure that all activities are business driven.

FEA is discussed next. DOD Directive 8000.1 establishes policy and assigns responsibilities for completing a FEA whenever additional expenditures for IT are contemplated. What is FEA?

"It is a structured proposal that serves as the principal part of a decision package for enterprise leadership. It includes an analysis of functional process needs or problems, proposed solutions,

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assumptions and constraints, alternatives, life-cycle
costs and benefits, and investment risk analysis."[32]

Why is FEA a good idea? FEA is a good idea because it uses
costing methodologies like Activity Based Costing (ABC) that give
managers a clear picture of business costs. The ABC methodology
reorganizes traditional financial information into a form that
persons other than accountants can understand. It places costs on
the output enabling functional managers to determine the value of
an activity and prioritize it. Bottom line, it makes it possible
to identify non-value added activities or ones with only marginal
value prior to applying automation.[33] The emphasis is on business
needs and strategy and not just the application of new technology.

TQM is the fourth and last CIM management tool discussed.
TQM is an important component of CIM because CIM emphasizes the
most fundamental aspects of the TQM philosophy: the role of
leadership, the need for a positive environment, employee
participation, customer satisfaction, and continuous improvement.
However, it is important to recognize that while TQM emphasizes
narrowly focused and long-term incremental change CIM also looks
at the short-term and takes a cross-functional view. CIM can
cause radical changes to gain substantial cost reductions.[34] In an
environment characterized by rapid downsizing and severe budget
reductions it is important to understand the need for this sort of
radical change.

Experiences, past and present, point out the need for a CIM
strategy that supports HQDA business activity. To manage a large
and diverse organization decision makers and management must have

timely, accurate, and consistent information in useful formats. To achieve this, information must be managed using a total management strategy that reflects a commitment to building an IS infrastructure encompassing the systems, data, and processes--CIM.

Many pieces to this puzzle already exist. Most of the key ADP systems that support Army business activities are undergoing modernization or replacement; however, they remain stovepipes. There is currently no overarching plan or policy with sufficient emphasis to integrate these systems and form a strong IS infrastructure. This must change. Initial costs to implement a corporate information management program may be significant but the payoff substantial. Many of the ingredients necessary for implementing CIM are already in place: hardware, software and communications. Only direct involvement and emphasis by top management are lacking. By 1997 the total DOD cash flow will be reduced by approximately $410 billion. Some $70 billion of that is supposed to be achieved by streamlining information processes. Only $2 billion of the seventy will come from data center consolidation and changes in software; the rest will come from management improvements.[35] This reduction will be felt by all the Armed Services and DOD. And even though initial costs may be high the Army cannot afford not to adopt CIM.

Benefits Of CIM. CIM will ensure that IS use and growth is driven by the Army's business needs. It will help the Army leverage its IS investment for maximum benefit and advantage. CIM will do this by providing better access to information across organizational and functional lines; Improving information

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availability (understanding what is available, where it is, how to get it, and what it means); eliminating unnecessary data redundancy (reducing the costs to collect, process, report, and store data); improving system flexibility through data independence (easier to change software, hardware, and modify data); and improving accuracy, timeliness and consistency.

Alternative Approaches. There are several alternative approaches for implementing CIM at HQDA: centralized, shared, or decentralized management. Decentralized management is not discussed since it is very much like the status quo that has already been addressed, in detail.

Centralized Approach. This approach to CIM would require the establishment of a central office or agency at the headquarters (probably under the Director of the Army Staff (DAS)). This activity would be responsible for all information policy pertaining to systems planning, data management, education and technology assessment. This approach has several advantages: strong emphasis from the top; high visibility throughout the staff and Army; consolidation of resources; emphasizes common approaches and standards; reduces staffing overall by minimizing duplication. The approach has several disadvantages: HQDA agencies will resist tight control; the possibility of reduced emphasis on the needs of individual staff agencies; and the possibility of project delays due to workload.

Shared Approach. This approach is like the centralized approach regarding responsibility for CIM policies. However, in addition to a central office or agency under the DAS, an oversight

committee would be formed. It would include representatives from each HQDA staff agency who would decide policy matters. The HQDA CIM staff would have full review and approval authority for all information system plans. The other functions such as education and technology assessment would be performed by another agency; perhaps the data processing installation (DPI) servicing the headquarters. Each staff agency would be responsible for its own data management program; subject to review by the CIM staff.

This approach has several advantages: emphasis is at a level that will ensure policy compliance; it directly involves the user in CIM policy development; it leaves the staff agencies with the capability to deal with their own needs; it encourages cooperation and coordination among the servicing DPI, CIM staff and policy makers, and functional proponents. There are several disadvantages: limitations on size, composition, and the number of committee meetings. There may be limited quick response capability; increased bureaucracy at the headquarters; and possible communication problems due to the need to coordinate extensively.

RECOMMENDATION

The VCSA should establish a working group to develop a plan for implementing the shared approach to CIM at HQDA. The shared approach is preferred. It will centralize enough authority and responsibility at a high enough level to ensure CIM is implemented and sustained. It would directly involve all staff agencies in policy making. It is highly participatory and will engender a

sense of ownership in the process. It is less threatening since each staff will retain a degree of autonomy and operational capability. The working group should include members from all Army staff agencies and report directly to the DAS. They should address CIM roles, responsibilities, policies, and ADP support activities. They should be articulated in ARs 1-1 and 10-5. The plan must provide a blueprint that addresses IS management; identifies required information management tools; and transitions the headquarters to CIM without adversely impacting operations. The DAS should establish the HQDA agency or office responsible for managing (directing and controlling) the headquarters corporate information management program as soon as possible so it can work closely with the working group.

Information and information systems are critical resources. We cannot manage the Army and defend programs without them. They must be managed with the same diligence as other corporate resources. Leadership commitment to a comprehensive CIM program will help ensure that IS is well managed and Army decision makers can respond effectively to future management and leadership challenges.

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